Effects of Familiarity on Short-term Memory Representations and Processes

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**Introduction**

**General Goals**
- To examine how stimulus familiarity influences visual short-term memory (STM) representations and processes.
- To explore the relationship between STM and long-term memory (LTM).

**Approach**
- Stimulus familiarity is established through participants’ prior multimedia Pokémon experience without time-consuming laboratory training.

**Hypotheses (Exp. 1~4)**
- Existing LTM should increase the efficiency and speed of STM encoding.
- This effect could manifest as larger STM storage capacity when STM encoding time is incomplete.

**Method: Visual STM and ROC**
- The number and resolution of retained visual STM representations (Zhang & Luck, 2008) assessed using ROCs.

**Experiments and Results**

**Exp.1 Familiarity Increases Visual STM Storage Capacity**

Conclusion: Familiarity inflates visual STM storage capacity (overall K and K_{ol}) with little effect on resolution (d').

**Exp.2 Familiarity Speeds Up Visual STM Consolidation**

Conclusion: Familiarity speeds up visual STM consolidation, leading to inflated visual STM capacity under limited encoding time.

**Exp.3 Eliminating Inflated Capacity with Sufficient Consolidation**

Manipulation: Memory array duration was increased to 1,000 ms to allow consolidation to complete. No masking during the delay period.

Conclusion: Comparable capacity across high- and low- familiarity

**Exp.4 But Accelerated Visual STM Consolidation Stays: ERP evidence**

Behaviorally no significant effect on capacity, consistent with Exp. 3.

Contra-lateral Delay Activity (CDA) aggregated from 5 pairs of posterior electrode sites (F3/4, P6/5, P7/8, P3/4, O7/8).

Conclusion: Familiarity speeds up visual STM consolidation (CDA fractional latency) without significant effect on capacity (CDA amplitude & K)

**Exp.5 Effects of Familiarity Is Short-Lived!**

Conclusion: Visual STM boost by familiarity could not survive a short delay, even though it is robust to interference.

**Exp.6 Familiarity Facilitates Visual STM retrieval**

Conclusion: Familiarity facilitates Visual STM retrieval in that familiar items attract attention at retrieval.

References: